

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**Applicants:** M. OOE, et al.

**Serial No.:** 10/585,738

**Filed:** JULY 12, 2006

**For:** PHOTSENSITIVE POLYMER COMPOSITION, METHOD OF  
PRODUCING PATTERN AND ELECTRONIC PARTS

**Group AU:** 1794

**Examiner:** Gerard T. Higgins

**Confirm. No.** 7230

**DECLARATION UNDER 37 CFR 1.132**

**Commissioner for Patents**

**P.O.Box 1450**

**Alexandria, Virginia 22313-1450**

**SIR:**

I, Masayuki Ooe, a citizen of Japan, residing at 2-24-6, Juou-cho, Hitachi  
City, Ibaraki, Japan,

**DECLARE THAT:**

1. I graduated in 1987 from the School of Interdisciplinary Science and

Engineering in the Graduate School of Kyushu University, Department of Molecular Engineering;

2. I joined Hitachi Chemical Co., Ltd. in October 1996, and was transferred to Hitachi Chemical DuPont Microsystems Ltd. in November 1997, and my present area of research is investigation into development and mass production of new photosensitive, alkali-developed, positive-type polyimides and polybenzoxazoles;
3. I am one of the inventors named in U.S. Patent Application No. 10/585,738, filed July 12, 2006 (hereinafter "the above-identified application"), and I am familiar with the Office Action mailed April 14, 2009, therein;
4. I conducted the following comparative experiment under my direct supervision:

**Additional Comparative Example C**

A photosensitive polymer composition was obtained by the same constitution, combined amounts and procedures as in Example 1 on pages 25 and 26 of the specification of the above-identified application, except that bis(2-hydroxy-3-hydroxymethyl-5-methylphenyl)methane was used in place of 2,2-bis[3,5-bis(hydroxymethyl)-4-hydroxyphenyl]-1,1,1,3,3,3-hexafluoropropane.

The obtained photosensitive polymer composition was applied on a rotating silicon wafer by a spinner, and heated and dried on a hot plate at 120°C for 3 minutes to obtain a coating film of 11.7 $\mu$ m. An exposure treatment was given to this coating film via a reticle by using an i-line stepper (supplied from Canon Inc.) as an exposure apparatus and changing exposure amounts in the range of 100 to 810 mJ/cm<sup>2</sup>, with an increment of 10mJ/cm<sup>2</sup>. Then a paddle development for 65 seconds was performed using an aqueous solution of 2.38% by weight of tetramethyl ammonium hydroxide as a developing solution, and the coating film was washed with purified water to obtain patterns. The proper exposure amount was determined to be 340 mJ/cm<sup>2</sup> by observing the obtained patterns, which means that the sensitivity was not so high. It was confirmed that the pattern having a good shape down to a dimension of 3 $\mu$ m was formed by this exposure amount. A film remaining ratio in an unexposed portion was 81 %.

The obtained pattern was heated at 350°C under a nitrogen atmosphere for one hour, consequently, the pattern of a polybenzoxazole film having the good shape was obtained, and no deformation of the pattern owing to the cure was observed.

5. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United State Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: Dec. 21. 09

Masayuki Ooe

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